ARC TYPE F-19A ISOLATION AMPLIFIER

Aircraft Radio Corporation
BOONTON, NEW JERSEY

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7010104
ARCIB-F19A-1
November 1960
Printed in U.S.A.

Dimensions: 3-7/16 in. wide by 1-17/32 in. high by 1-7/8 in. deep

Certification: FAA TSO C-50a, Category B

INSTALLATION

The F-19A and audio load resistors may be installed in any convenient location near the receiver selector switches. The shielded audio leads between the output connectors of the receivers and the switches and between the switches and the F-19A should be kept as short as possible.

Install the F-19A as follows:

Step 1. Install receiver selector switches, F-19A power switch, audio load resistors, emergency headset jacks, and other system parts in convenient locations.

Step 2. Drill aircraft mounting surface, which should be clean, bare metal, for four No. 4 binding head machine screws, located as shown in Figure 3.

Step 3. Solder audio leads, ground lead, and LV+ lead to appropriate F-19A terminals.

Step 4. Place unit in position, insert screws through F-19A mounting holes, and secure unit with nuts and lockwashers.

Step 5. Apply a receiver output signal to F-19A, and adjust level control of F-19A for desired headset volume or speaker-amplifier input signal level.

Note

If a volume control is used in aircraft's audio distribution system, set control to mid-position before adjusting F-19A level control.

MAINTENANCE

Schematic and wiring diagrams of the F-19A are shown in Figures 5 and 6, respectively. In case of faulty operation, remove the cover of the amplifier and inspect for loose connections and evidence of overheating. If the visual inspection does not disclose the trouble, use a d-c vacuum tube voltmeter to check for abnormal voltages at the points specified on the schematic diagram. Table I lists the test equipment required to maintain the F-19A; equivalent test equipment may be substituted.

TABLE I. TEST EQUIPMENT

Qty	Name	Designation	Characteristics
1	Audio Oscillator	Hewlett-Packard Model 200AB	—
1	Low-voltage Supply	—	28 volts, 5 amperes dc
1	Milliammeter	Weston Model 301	0 to 250 ma
1	Oscilloscope	Dumont Model 208	—
10	Resistor	—	330 ohms, 1 watt, carbon
1	Resistor	—	600 ohms, 1 watt, carbon
1	Rotary Switch	—	10 positions, nonshorting
10	Toggle Switch	—	Single pole, double throw
2	Vacuum Tube Voltmeter	Ballantine Model 300	—
1	Vacuum Tube Voltmeter	Hewlett-Packard Model 410B	—
1	Voltmeter	Weston Model 301	0 to 50 volts dc

Test the F-19A as follows:

Step 1. Interconnect F-19A and test equipment and set switches as shown in Figure 4. Apply power to test equipment and F-19A, and allow a 15-minute warmup period.

Step 2. Set F-19A level control fully clockwise (maximum output).

Step 3. With no audio signal applied to F-19A, measure amplifier idle current. Current should not be greater than 60 ma.

Step 4. Adjust Hewlett-Packard Model 200AB to obtain a 1000-cps, 7.75-volt F-19A output. Measure audio oscillator output voltage. Voltage should be between 2.4 and 5.75 volts.

Step 5. Set F-19A level control fully counterclockwise. F-19A output should be reduced at least 19 db. Set level control fully clockwise.

Step 6. Adjust audio oscillator AMPLITUDE control to obtain a 2.45-volt F-19A output. Maintain a constant audio oscillator output voltage while varying output frequency between 350 and 3000 cps. F-19A output should not vary from 7.75 volts by more than ±3 db.

Step 7. Adjust audio oscillator to obtain a 1000 cps, 7.75-volt, F-19A output.

Step 8. Observe F-19A output waveform on Dumont Model 208 Oscilloscope. Distortion should not be greater than 20%.

Note

If an oscilloscope is not available, an aural test should be used to determine if F-19A output contains objectionable distortion.

Step 9. Set switch S11 to position 1. Measure signal level at F-19A terminals 2 through 10. Signal level at these terminals should be at least 40 db below 7.75-volt input signal level.

Step 10. Using appropriate F-19A input terminals, repeat Step 9 for each position of switch S11.

Step 11. With switch S11 set to position 10, set switches S1 through S9 to ground position. F-19A output should not change.

PARTS LIST

A list of replaceable parts for the F-19A is given in Table III. The manufacturers' codes listed in Table III are explained in Table II.

TABLE II. MANUFACTURERS' CODES

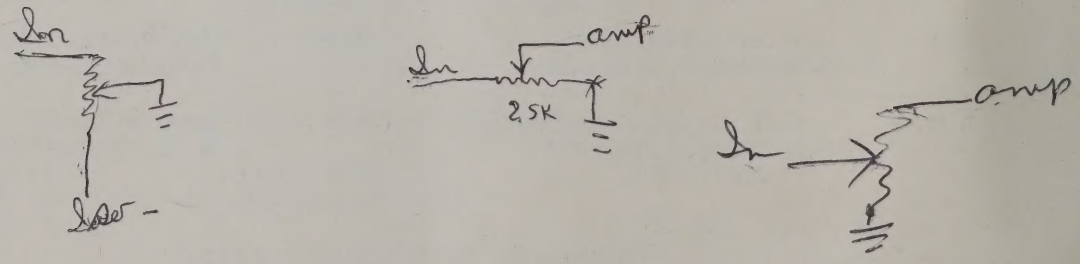
Code	Name and Address	Code	Name and Address
AB	Allen-Bradley Co. Milwaukee, Wisconsin	DABU	Dale Products, Inc. Columbus, Nebraska
CMPB	Colin-Campbell Co., Inc. Danbury, Connecticut	SPR	Sprague Electric Co. North Adams, Massachusetts

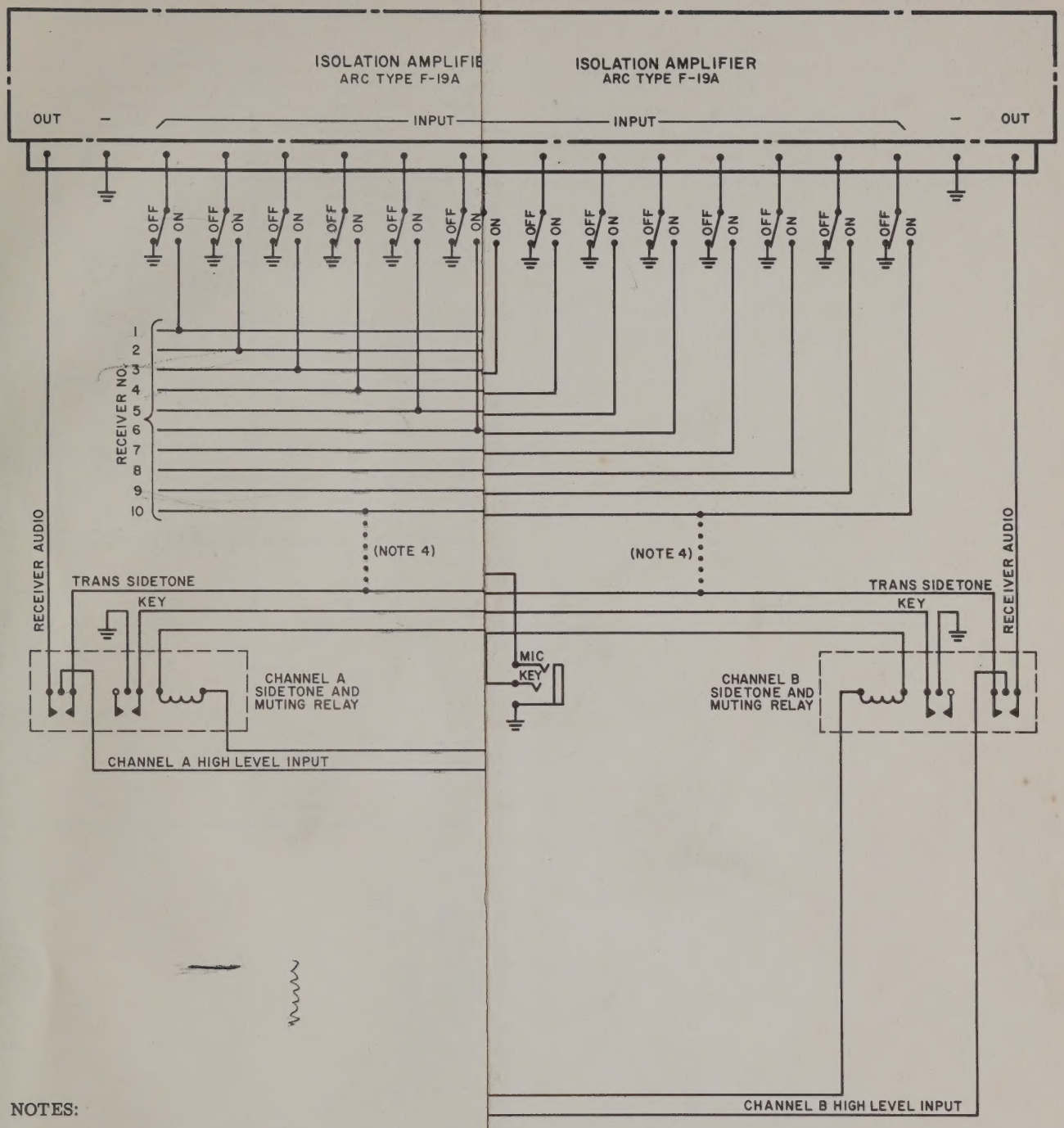
TABLE III. REPLACEABLE PARTS

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.
C1	CAPACITOR, Fixed, electrolytic, 6.8 μf ±20%, 35 vdcw	21485-9681	SPR 150D685X0035B2
C2	CAPACITOR, Fixed, electrolytic, 47 μf ±20%, 20 vdcw	8914-0470	SPR 150D476X0020R2
C3	CAPACITOR, Fixed, electrolytic, 60 μf ±20%, 6 vdcw	8918-0600	SPR 150D606X0006B2

TABLE III. REPLACEABLE PARTS - Continued

Reference Designation	Description	ARC Part No.	Manufacturer & Part No.
C4	CAPACITOR, Fixed, same as C2		
C5	CAPACITOR, Fixed, electrolytic, 47 μf ±20%, 50 vdcw	8924-0470	SPR 109D476X0050F2
Q1	TRANSISTOR, Type 2N647	22442	
Q2	TRANSISTOR, Type 2N1183	8984-0002	
R1	RESISTOR, Fixed, comp, 33,000 ohms ±10%, 1/4w	200-0333	AB CB3331
R2	RESISTOR, Fixed, same as R1		
R3	RESISTOR, Fixed, same as R1		
R4	RESISTOR, Fixed, same as R1		
R5	RESISTOR, Fixed, same as R1		
R6	RESISTOR, Fixed, same as R1		
R7	RESISTOR, Fixed, same as R1		
R8	RESISTOR, Fixed, same as R1		
R9	RESISTOR, Fixed, same as R1		
R10	RESISTOR, Fixed, same as R1		
R11	RESISTOR, Fixed, comp, 1500 ohms ±5%, 1/2w	201-0152	AB EB1525
R12	RESISTOR, Fixed, comp, 1200 ohms ±5%, 1/2w	201-0122	AB EB1225
R13	RESISTOR, Fixed, comp, 470 ohms ±5%, 1/2w	201-0471	AB EB4715
R14	RESISTOR, Fixed, comp, 33 ohms ±5%, 1/2w	201-0330	AB EB3305
R15	RESISTOR, Fixed, comp, 220 ohms ±5%, 1/2w	201-0221	AB EB2215
R16	RESISTOR, Fixed, comp, 10 ohms ±5%, 1/2w	201-0100	AB EB1005
R17	RESISTOR, Fixed, comp, 22 ohms ±5%, 1/2w	201-0220	AB EB2205
R18	RESISTOR, Fixed, ww, 300 ohms ±3%, 3w	209-0301	DABU RS2-301H
R19	RESISTOR, Variable, comp, 1000 ohms ±20%, 1/2w	8915-0102	AB GLU1022SD3028L
T1	TRANSFORMER, Audio output	18558	CMPB L-1872A





NOTES:

1. SPEAKER CONNECTIONS SHOWN ARE FOR 8-OHM SPEAKERS. REFER TO ARC TYPE F-16A INSTRUCTION BOOK FOR OTHER SPEAKER CONNECTIONS.

2. USE HIGH-IMPEDANCE (600-OHM) HEADSETS ONLY.

3. USE CARBON PRESS-TO-TALK MICROPHONE ONLY.

4. IF THE PILOT DESIRES TO MONITOR THE C PILOT'S SIDETONE CIRCUIT, OR THE COPIL THE PILOT'S SIDETONE CIRCUIT, CONNECT SIDETONE LEADS TO F-19A INPUT LEAD AS SHOWN BY THE DOTTED LINES.

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Figure 2. F-19A Isolation Amplifier, Typical Interconnection Diagram

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R14	RESISTOR, Fixed, comp, 33 ohms ±5%, 1/2w	201-0330	AB EB3305
R15	RESISTOR, Fixed, comp, 220 ohms ±5%, 1/2w	201-0221	AB EB2215
R16	RESISTOR, Fixed, comp, 10 ohms ±5%, 1/2w	201-0100	AB EB1005
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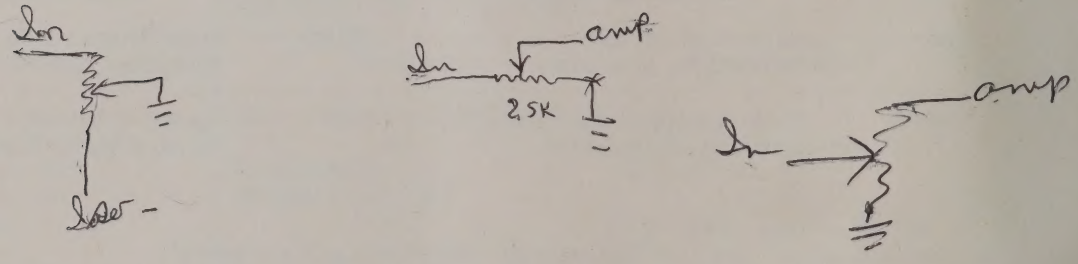

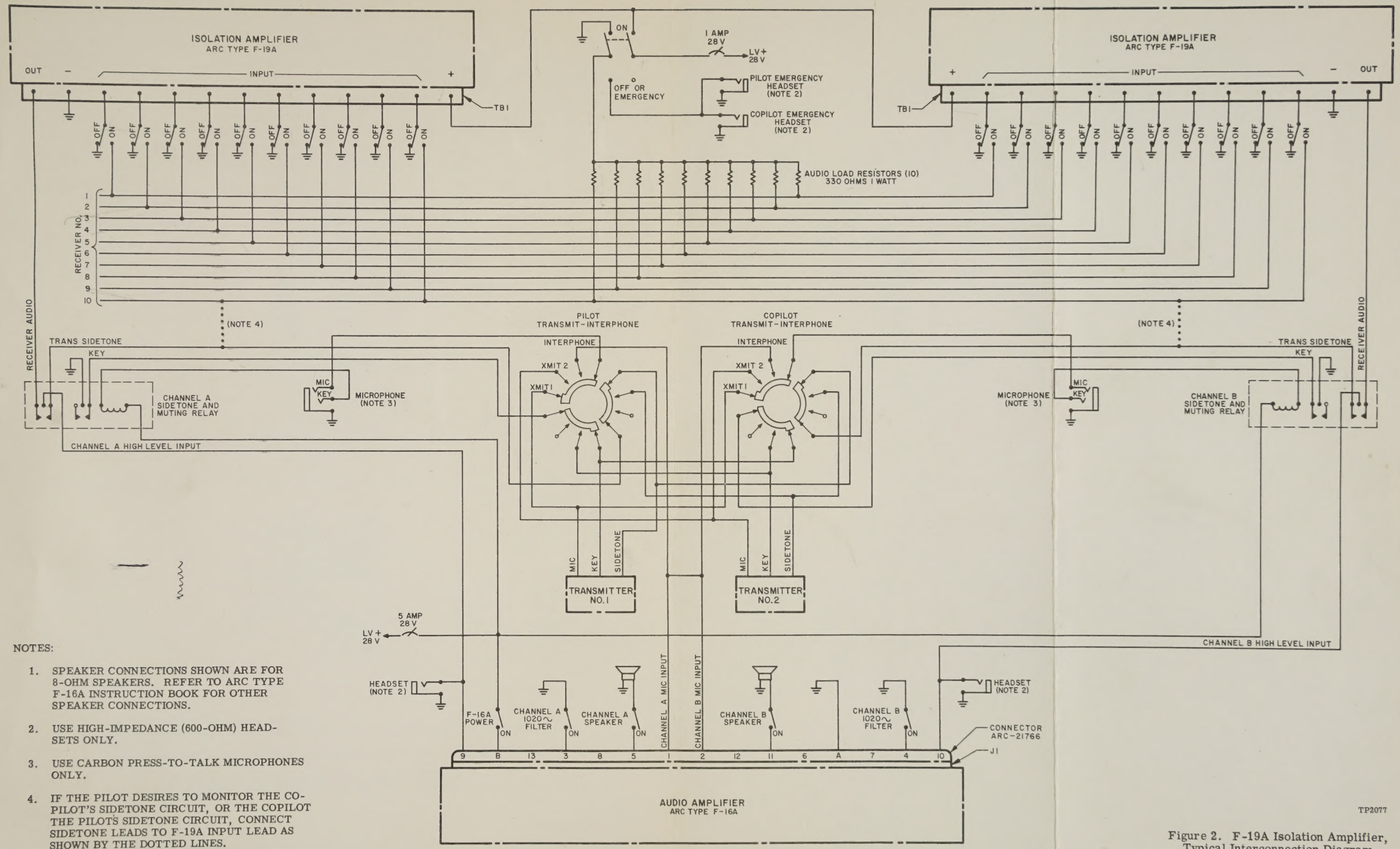

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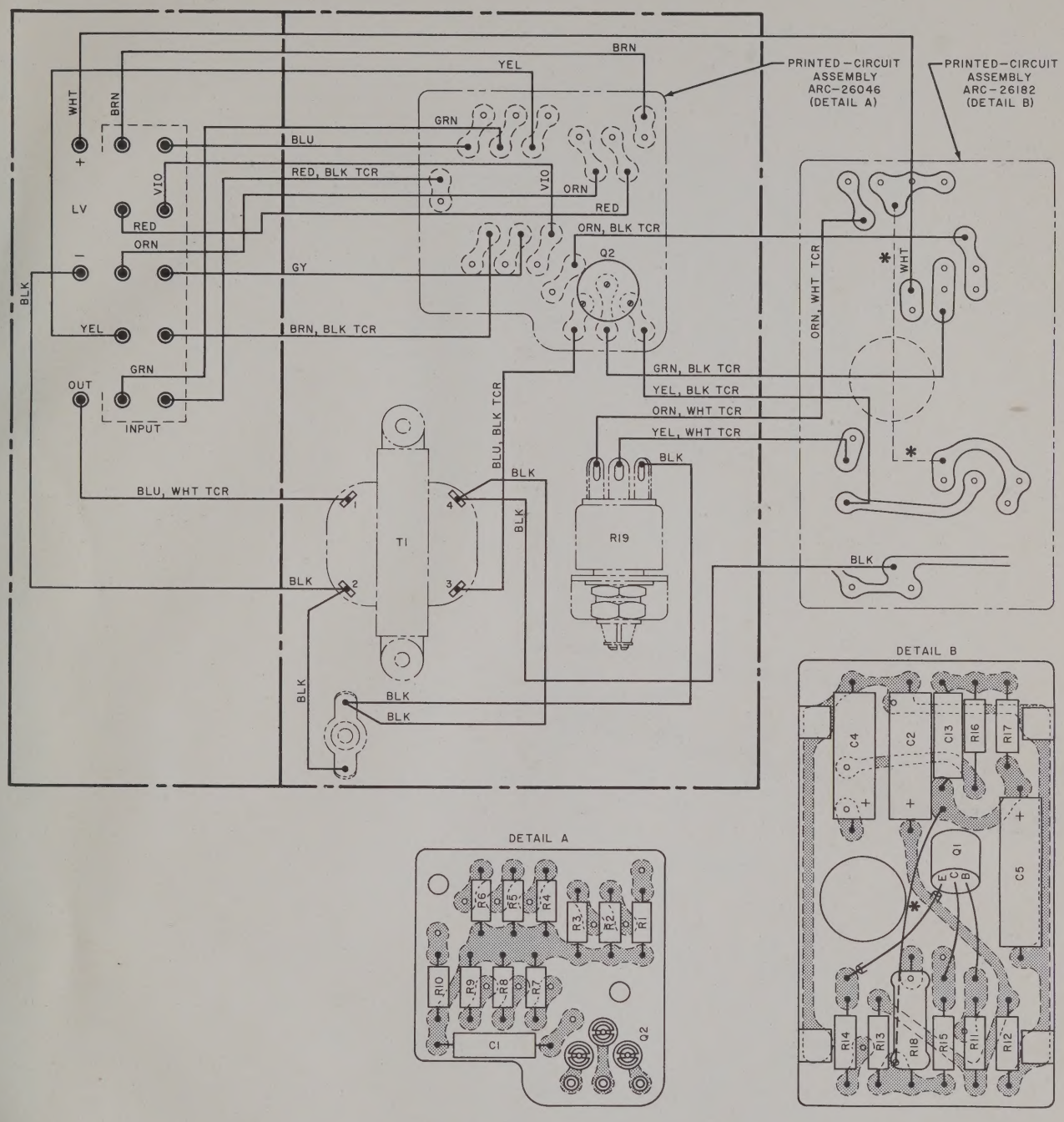
Figure 2. F-19A Isolation Amplifier, Typical Interconnection Diagram



NOTES:

1. FOR SCHEMATIC DIAGRAM, SEE FIGURE 5.
2. WIRES MARKED WITH COLOR NOTE ARE NO. 24 STRANDED COPPER, TEFLON INSULATED.
3. WIRE MARKED WITH AN ASTERISK (*) IS NO. 24 SOLID COPPER, TEFLON INSULATED.
4. 0.032 IN. TEFLON TUBING IS INSTALLED OVER WIRE MARKED ⊣⊢.
5. SHADED AREAS DENOTE UNETCHED COPPER ON OPPOSITE SIDE OF PRINTED-CIRCUIT BOARDS.

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Figure 6. F-19A Isolation Amplifier, Wiring Diagram